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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,641	02/25/2002	Thomas Jaworek	218789USOPCT	1925
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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
			EXAMINER TSOY, ELENA	
			ART UNIT 1762	PAPER NUMBER

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
10/049,641	JAWOREK ET AL.	
Examiner	Art Unit	
Elena Tsouy	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8, 9, 11-18 and 20-24 is/are rejected.
- 7) ☒ Claim(s) 7, 10 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Response to Amendment

Amendment filed on November 17, 2003 has been entered. Claim 6 has been cancelled. Claims 18-24 have been added. Claims 1-5, 7-24 are pending in the application.

Claim Objections

1. Claim 1 is objected to because of the following informalities: claim 1 should recite that a chain extender is component C in order to understand meaning of claim 20 reciting "The process as claimed in claim 1, wherein the urethane prepolymer consists of reacted units of (A), (B) and (C).".

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 24, line 2, "pentaerythritol penta/hexaacrylate" renders the claim indefinite because such a compound cannot exist since pentaerythritol has only 4 hydroxy groups. For examining purposes the phrase was interpreted according to specification (See page 8, lines 43-44) as "dipentaerythritol penta/hexaacrylate".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-5, 8, 9, 11, 12, 14-16, 20-23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard (US 4,133,723).

As to claims 2, 3, 7-9, 14, 20, 22, 23, Howard discloses a process for producing a mar-resistant coating (See column 12, lines 37-38), said process comprising applying to a substrate (See column 3, lines 65-66) such as aluminum (See column 15, lines 16-17) UV-curable coating composition (See column 11, lines 31-32) comprising a mixture of (i) 35-90 wt % (See column 7, lines 36-40; column 12, lines 23-24) unsaturated urethane oligomer having at least two double bonds per molecule (See column 4, lines 37-42; column 12, lines 15-18), (ii) 10-65 wt % of at least one reactive monomer diluent (See column 7, lines 36-40), e.g. combination of one or more polyfunctional reactive diluent (See column 7, lines 33-35) such as pentaerythritol tetra-acrylate (See column 7, lines 66-67), (iii) 1.0 wt % of photoinitiator (See column 11, Table II); and (iv) optionally at least one chain transfer agent (See column 7, lines 15-16) such as alkanolamine (See column 10, lines 25), dithiol (dimercaptan) (See column 10, lines 26-28), and polythiols (See column 10, lines 38-42), glycol mercaptoacetate (a molecule containing isocyanate-reactive group and hydrophilic stabilizing group) (See column 10, lines 32-33) to form a wet film (See column 13, line 56) and curing said coating by exposure to UV radiation in the presence of air or in inert gas atmosphere (See column 11, lines 21-23); wherein said urethane oligomer is obtained by

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successive reaction of at least one organic isocyanate compound having at least two isocyanate groups (component A) with at least one unsaturated addition-polymerizable monomeric compound having a single isocyanate-reactive active hydrogen group (See column 3, lines 41-49; column 5, lines 61-63) such as 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate (component B) (See column 6, lines 4-5) in an amount being sufficient to provide at least one molar equivalent of active hydrogen group with respect to isocyanate functionality, and preferably is sufficient to afford an active hydrogen group: NCO ratio, with respect to the amount of total free hydroxyl functions, of at least 1:1 (i.e. at least 25 wt% of isocyanate groups of the component A react with the component B) (See column 6, lines 10-18), to form unsaturated isocyanate- functional compound, which is then reacted with polyoxyallylene oxide polyol (polyol chain extender) (component C) (See column 6, lines 24-29) such as C1-C9 polyols having at least two hydroxy groups (aliphatic diol) (See column 5, lines 15-59). The coating composition may contain various additives including fillers, pigments, etc. in well-known concentrations (See column 11, lines 5-15).

The Examiner Note: unsaturated urethane oligomer of Howard is aliphatic urethane methacrylate prepolymer of claimed invention because it is prepared by reacting the same components A B, and C (See specification, page 4, lines 5-47; page 5, lines 1-6; page 7, lines 7-10).

Howard fails to teach that: the urethane oligomer has (a) a viscosity in the range of 250-11,000 mPa·s (Claim 1), (b) number-average molecular weight of 500-5000 (Claim 4), a double bond equivalent weight of 250-2000 (Claim 5) or 300-900 (Claim 16); the coating composition comprises 2-40 wt % of pigments (Claim 11); 1-30 wt % fillers (Claim 12), up to 15 wt % of further additives (Claims 15, 21).

Howard further teaches that control over the properties of the cured systems can be exercised via the structure of the oligomer backbone, including such factors as degree of chain-branching, types of functional groups, number and types of unsaturated bonds, molecular weight (consequently viscosity), etc.; functionality and level of crosslinking agents; nature and level of reactive diluent; kind and level of the sensitizer or photoinitiator; and the like (See column 1, lines 52-59). In other words, limitations of claims 1, 4, 5, 11, 12, 15, 16, 21 are result-effective parameters in a coating process.

It is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). See also In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant result-effective parameters (including those of claims 1, 4, 5, 11, 12, 15, 16, 21) in a process of Howard through routine experimentation in the absence of a showing of criticality.

6. **Claims 13, 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard (US 4,133,723) in view of Sachs et al (US 4,675,234).

Howard fails to teach that the coating composition is applied to a substrate twice with drying a first coating before applying a second coating, and then curing the final coating (Claim 13) wherein the basecoat is pigmented (Claim 17).

Sachs et al teach that UV-curable urethane acrylate containing compositions can be used for applying as a first pigmented layer and a second clear layer to metal substrate (See column 2, lines 1-8, 20, 49-65), which can be cured either in one stage after both coatings are applied to the substrate or in two stages (See column 2, lines 9-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used UV-curable urethane acrylate containing composition of Howard for forming a first pigmented layer and a second clear layer on a metal substrate with curing in two stages in an inert atmosphere with the expectation of providing the desired cured coated article since Sachs et al teach that UV-curable urethane acrylate containing compositions can be used for applying as a first pigmented layer and a second clear layer to metals wherein the curing is conducted either in one stage after both coatings are applied to the substrate or in two stages.

7. **Claims 18, 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard (US 4,133,723) in view of Lin (US 6,007,966).

Although Howard, as applied above, teaches that the coating composition comprises polyfunctional reactive diluent (See column 7, lines 33-35) such as pentaerythritol tetra-acrylate (See column 7, lines 66-67), Howard does not expressly show that the polyfunctional reactive diluent also includes dipentaerythritol penta/hexaacrylate.

Lin teaches that the presence of unsaturated photomonomer including trimethylolpropane triacrylate, pentaerythritol triacrylate, pentaerythritol tetraacrylate, dipentaerythritol pentaacrylate, dipentaerythritol hexaacrylate, urethane acrylate or in combination thereof in the photosensitive composition provides the required double bonds to proceed with the polymerization reaction upon exposure to UV light. The higher the number of double bonds is present per molecule, the higher the degree of crosslinking. The choice of the optimal photomonomers and the amount used are dependent on the *desired hardness* of the final product. See column 5, lines 16-28.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used dipentaerythritol penta/hexaacrylate instead of pentaerythritol tetraacrylate as polyfunctional reactive diluent in Howard with the expectation of providing the desired improved

hardness since Lin teaches that the higher the number of double bonds is present per molecule, the higher the degree of crosslinking, i.e. hardness of the final product.

Allowable Subject Matter

8. Claims 7, 10 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of the record does not teach or suggest that: (i) a component A is obtained by reacting a low molecular mass aliphatic diisocyanate or polyisocyanate with polyol (limitations of Claim 7); (ii) at least a portion of the free isocyanate groups of the urethane methacrylate prepolymer have been reacted with hydroxyalkyl esters of aliphatic dicarboxylic acids, alkylamine amides of aliphatic dicarboxylic acids or mixtures thereof, having at least 6 carbon atoms (limitations of Claim 10); (iii) the aliphatic urethane prepolymer comprises reacted groups of diamine or polyamine (limitations of Claim 19).

Response to Arguments

9. Applicant's arguments with respect to claims 1-5, 7-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy whose telephone number is (571) 272-1429. The examiner can normally be reached on Mo-Thur. 9:00-7:30, Mo-Thu.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for all communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Elena Tsoy
Examiner
Art Unit 1762

January 20, 2004